

WHAT IS CLAIMED IS:

- 1           1. A method for treating a person suffering from head trauma associated  
2 with elevated intracranial pressures, the method comprising:
  - 3                 delivering a positive pressure breath to the person;
  - 4                 actively extracting respiratory gases from the person's airway following the  
5 positive pressure breath to create an intrathoracic vacuum to lower pressures in the venous  
6 blood vessels that transport blood out of the head to thereby reduce intracranial pressures; and  
7                 repeating the steps of delivering positive pressure breaths and extracting  
8 respiratory gases.
- 1           2. A method as in claim 1, wherein the positive pressure breath is  
2 delivered using a mechanical ventilator.
- 1           3. A method as in claim 1, wherein the respiratory gases are extracted  
2 with a constant extraction, varied over time, or a pulsed extraction.
- 1           4. A method as in claim 1, wherein the breath is delivered for a time in  
2 the range for about 250 milliseconds to about 2 seconds.
- 1           5. A method as in claim 1, wherein the breath is delivered at a rate in the  
2 range from about 0.1 liters per seconds to about 5 liters per second.
- 1           6. A method as in claim 1, wherein the vacuum is maintained at a  
2 pressure in the level from about 0 mmHg to about -50 mmHg.
- 1           7. A method as in claim 6, wherein the vacuum is maintained with  
2 negative flow or without flow.
- 1           8. A method as in claim 1, wherein the time the positive pressure breath  
2 is supplied relative to the time in which respiratory gases are extracted is in the range from  
3 about 0.5 to about 0.1.
- 1           9. A method as in claim 1, wherein the respiratory gases are extracted  
2 using equipment selected from a group consisting of a mechanical ventilator, a phrenic nerve  
3 stimulator, an extrathoracic vest, a ventilator bag, and an iron lung cuirass device.

1                   10.     A method as in claim 1, further comprising coupling a threshold valve  
2 to the person's airway, wherein the threshold valve is configured to open with the person's  
3 negative intrathoracic pressure exceeds about -5 cmH<sub>2</sub>O.

1                   11.     A method as in claim 1, wherein the respiratory gases are lowered to  
2 an intrathoracic pressure of about -5 mmHg to about -10 mmHg and then kept generally  
3 constant until the next positive pressure breath.

1                   12.     A method as in claim 1, wherein the positive breath is slowly delivered  
2 and the respiratory gases are rapidly lowered to an intrathoracic pressure of about -10 mmHg  
3 to about -20 mmHg and then gradually reduced towards about 0 mmHg.

1                   13.     A method as in claim 1, wherein the respiratory gases are slowly  
2 lowered to a pressure of about -20 mm Hg.

1                   14.     A method for treating a person suffering from head trauma associated  
2 with elevated intracranial pressures, the method comprising:  
3                   coupling a mechanical ventilator to a person;  
4                   actively delivering a positive pressure breath to the person using the ventilator;  
5                   extracting respiratory gases from the person's airway following the positive  
6 pressure breath using the mechanical ventilator to create an intrathoracic vacuum to lower  
7 pressures in the venous blood vessels that transport blood out of the head to thereby reduce  
8 intracranial pressures; and  
9                   repeating the steps of delivering positive pressure breaths and extracting  
10 respiratory gases.

1                   15.     A method as in claim 14, wherein the respiratory gases are extracted  
2 with a constant extraction, varied over time, or a pulsed extraction.

1                   16.     A method as in claim 14, wherein the breath is delivered for a time in  
2 the range for about 250 milliseconds to about 2 seconds.

1                   17.     A method as in claim 14, wherein the breath is delivered at a rate in the  
2 range from about 0.1 liters per seconds to about 5 liters per second.

1                   18.     A method as in claim 14, wherein the vacuum is maintained at a  
2 pressure in the level from about 0 mmHg to about -50 mmHg.

1                   19.     A method as in claim 18, wherein the vacuum is maintained with  
2 negative flow or without flow.

1                   20.     A method as in claim 14, wherein the time the positive pressure breath  
2 is supplied relative to the time in which respiratory gases are extracted is in the range from  
3 about 0.5 to about 0.1.

1                   21.     A method as in claim 14, wherein the respiratory gases are extracted  
2 using equipment selected from a group consisting of a mechanical ventilator, a phrenic nerve  
3 stimulator, a ventilator bag, and an iron lung cuirass device.

1                   22.     A method as in claim 14, further comprising coupling a threshold valve  
2 to the person's airway, wherein the threshold valve is configured to open with the person's  
3 negative intrathoracic pressure exceeds about -5 cmH<sub>2</sub>O.

1                   23.     A method as in claim 14, A method as in claim 1, wherein the  
2 respiratory gases are lowered to a pressure of about -10 mmHg and then kept generally  
3 constant until the next positive pressure breath.

1                   24.     A method as in claim 14, A method as in claim 1, wherein the positive  
2 breath is slowly delivered and the respiratory gases are rapidly lowered to a pressure of about  
3 -20 mmHg and then gradually reduced towards about 0 mmHg.